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The Stromatoceria of Isle La Motte, Vermont.

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STROMATOCERIA

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Isle La Motte, Vermont,

BY

H. M. SEELY,

MIDDLEBURY, VT.

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PLATE LXX.

Stromatocerium rugosum.

The Stromatoceria of Isle La Motte, Vermont.

By H. M. Seely, Middlebury, Vt.

A preface and a help to the study of the various forms of Stromatoceria in the divisions of the Chazy rocks will be found in a fresh reading of Professor James Hall's description of the genus and the typical species. The essential portions of the description are here reproduced. Reference is especially made to Hall's Pal. N. Y., Vol. I, Page 48, and Plate XII.

"GENUS STROMATOCERIUM."

"In the black marble of Isle La Motte, and in the same rock at Chazy but particularly in the dark limestone containing *Columnaria* we find numerous specimens of obscure corals having a structure represented in figures (given). They are completely silicified so that the more minute structure cannot be decided; but since they are abundant and require notice I have proposed the provisional name *Stromatocerium*, from *Stroma*, a layer, or lamina, and *Karion*, honeycomb."

"STROMATOCERIUM RUGOSUM."

Pl. LXX, Pl. LXXIV, fig. 5.

"Coral hemispherical; growth in concentric laminae or strata; laminae, numerous, wrinkled; some faint indications of vertical tubes or cells.

"This coral usually appears as a rough, shapeless excrescence upon the surface of the limestone; but a little examination shows it to be composed of concentric layers which are evidently the skeleton of some coral.

"Position and locality. This coral as far as is known is confined to the Black River limestone. * * * It occurs in the dark marble quarried on the east side of Isle La Motte. But

this mass lies much above the *Maclurea magna.* * * * It occurs at Chazy Village, Watertown and other places.''

The fossil to which Professor Hall gave the provisional name *Stromatocerium* has proved a good genus, and the early description still holds. Its characterization as a subhemispherical mass often silicified, as an excrescence upon the surface of the limestone, is strikingly characteristic. Its horizon is so well fixed that it has become a guide to the Black River, and its silicified mass has helped to distinguish the rock when all other fossil forms have disappeared. The specific name *rugosum* was well chosen the wrinkly character of the laminae usually accompanying the genus.

The number of localities where the fossil is found has been greatly increased. Along the islands south and through the Valley of Champlain wherever the Black River appears there the *Stromatocerium* finds a place. A most remarkable display is found in a stratum of rock near two feet in thickness made up wholly of *Stromatocerium* and *Columnaria* on a little island just off the shore of Ferrisburgh, Vt., known as Button Bay Island.

Though referred to in the original description as a coral its systematic position in classification like so many other ancient and extinct forms has remained somewhat in doubt.

The existence of this form has seemed entirely unique, a bubble on the crest of the sea of life, it appears, then as suddenly disappears.

Yet this isolation of species is seeming, not real. Whatever may be said of the notable mutation or sudden disappearance of this form, a careful study of the underlying rocks will show that an assumption of its sudden appearance is without foundation. The Chazy rocks of Isle La Motte offer complete evidence of the long time existence of the genus *Stromatocerium;* that the species *rugosum* does not stand alone. Two well defined species at least exist. Other forms for the present considered varietal may very likely be found to be really good species. And more, there are other examples which suggest close relationship to *Stromatocerium.*

PLATE LXXI.

Stromatocerium Eatonii, Seely, N. Photographed from a weathered surface.

If we go from the known to the nearest unknown we shall study these forms in the descending order, thus reaching first the one nearest, *S. rugosum*, in horizon and age.

It may assist just here to recall that in many localities the Chazy rocks may be helpfully distributed into three divisions, these A, B, C, reading from below upwards.

In division C Chazy there are strata that have been known as Upper Dove. In some localities this mass is notable for a wonderful display of the remains of cephalopods. With these cephalopods or just beneath them on Isle La Motte is found a *Stromatocerium* having for its own a distinct and peculiar character widely different from that of the typical species.

The fossil appears mostly in the form of sheets two to four inches in thickness accommodating itself to the varying surface of the underlying rock. In color it is light, in texture tough, yet on weathering, it breaks away into detached plates. The laminae are slightly rugose, thin, closely set, rather easily detachable from each other, on the upper surface are mostly in concentric circles or ringed about eye like points of varying size.

The early collections were made by the assistance of Professor W. W. Eaton.

The form may be appropriately distinguished by the name

STROMATOCERIUM EATONI. N. SP.

Pl. LXXI, Pl. LXXIV, fig. 2.

A stromatoceroid fossil occurring in sheets two or more inches in thickness; the upper surface usually covered with concentric rings, circling around elevations or eyelike points, laminae thin, scarcely rugose.

The tabulate mass and upper concentric laminae widely distinguish the species from *S. rugosum*.

Horizon. C Chazy.

Locality. Isle La Motte, Vt. Goodell's Ridge, south of Village.

Leaving this interesting horizon and going south and geologically down, B Chazy is reached. In this mass of rock that has

made the island famous, the larger number of quarries are situated. Early observers apparently did not make a clear distinction between the Black River rock and the dark strata here found; and possibly a confusion arose as to the exact naming of the early term, Isle La Motte limestone. We, in all probability, may consider the term as the equivalent of B Chazy.

Certain portions of its two hundred feet of rock abound in well preserved shells of *Maclurea magna*. In connection with the upper beds carrying this fossil and inclosed within them, are found large variable masses of stone, wavy in structure, light in color, from two to six feet in section. These have been recognized though not approved by the quarrymen. Examples, hand fragments, have been distributed to the museums of the State and known as banded limestone. The stone sawn and polished shows wavy laminae and forms a beautiful marble. The very size seems to have prevented a recognition of its true character. It is really a massive *Stromatocerium*. Occasionally a block raised from the quarry will be made up largely or even wholly of this fossil. In the upright wall of the quarry, a wrinkled, banded, lighter stone, it appears as a conspicuous object. Sent to the mills blocks containing the fossil have been sawn with other blocks, and wherever in the floors of corridors and public buildings in the eastern cities, the tiling of Isle La Motte marble with its sections of coiled *Maclurea* appears, there will often appear side by side, sections of this wavy fossil.

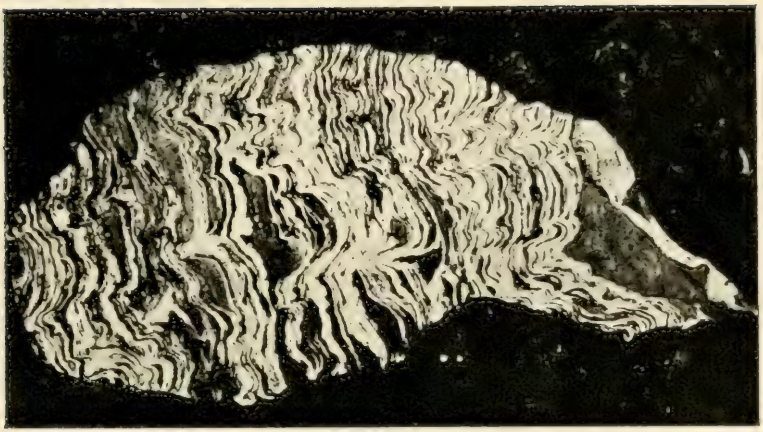
This form stands out by itself so conspicuously that it cannot well be placed with either of the species of *Stromatocerium* already named, and so should have a specific position of its own. These large examples so far as observed have been found only on this island and may appropriately bear its name.

STROMATOCERIUM LAMOTTENSE. N. SP.

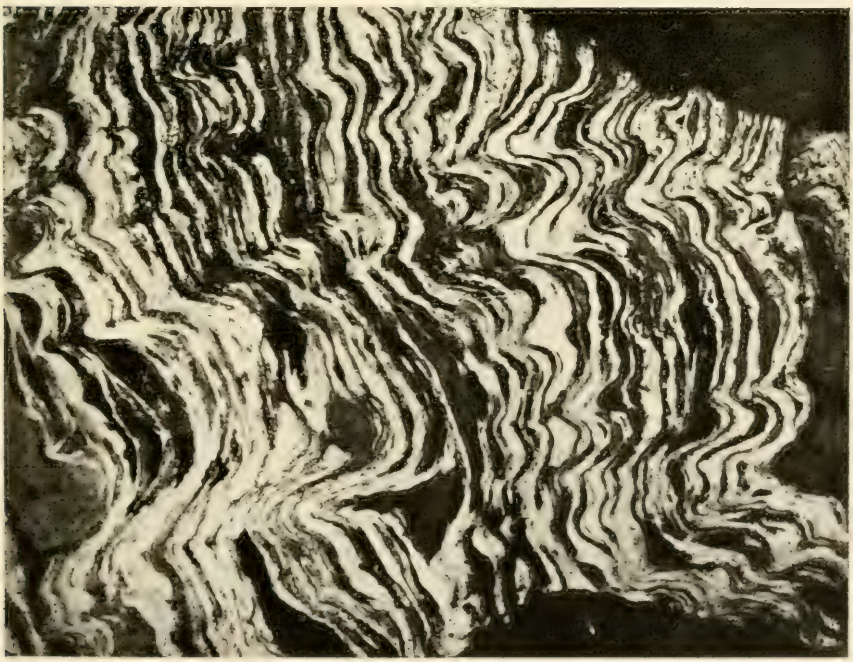
Pl. LXIX, Pl. LXXII, Pl. LXXIV, fig. 1.

A massive *Stromatocerium* two to six or more feet in section; variable in form; upper surface usually crenulate; laminae,

PLATE LXXII.

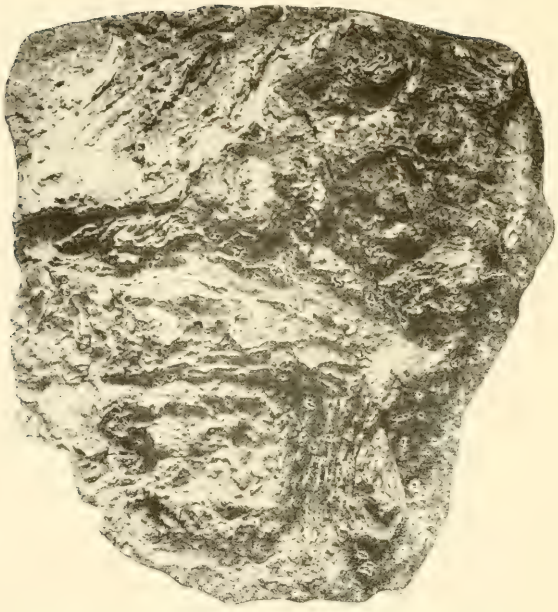


4-10 Natural Size.



Stromatocerium Lamottense, Seely. Natural Size.

PLATE LXXIII.



Stromatocerium Lamottense, var. Chazianum, Seely.

Stromatocerium Moniliferum.

wavy, coarse, irregular; texture, tough; the stone admitting of working and polishing as a marble. The exceeding massiveness and broad lamination especially characterize the species.

Horizon. B Chazy.

Illustrations. Massive fossil in wall of quarry. Plate LXIX. Entire specimen, reduced Plate LXXII, upper figure. Part of the above natural size showing coarse, irregular lamination. Plate LXXII, lower figure. Microscopic view. Plate LXXIV, Fig. 1.

This may be the proper place to call attention to the fact that while the forms *S. Eatoni* and *S. lamottense* have thus far been observed only on Isle La Motte the genus *Stromatocerium* exists in the Chazy rocks at other localities. The examples so far collected have come from the horizon that has afforded *S. lamottense* Middle B. Chazy. They have been obtained along the Valley of Champlain from Basin Harbor, Vt., Appletree Point, Vt., South Hero, Vt., and from the classic ground the Fisk Farm, Chazy, N. Y. These localities, particularly Chazy, N. Y., have yielded hemispherical masses of the shape of the old time straw beehive though much smaller in size. These examples so differ from *S. rugosum*, *S. Eatoni*, and *S. lamottense* in size, in manner of growth, in lamination, that they seem almost to demand a specific position. A valid species they may prove to be. But until the fields can be more carefully gleaned, and the examples more fully assembled and compared, it may be best to accord to them only a varietal place.

The form may have a provisional name.

Stromatocerium lamottense var. chazianum.

Pl. LXXIII, upper figure.

A stromatoceroid fossil mostly hemispherical in form, distinguished from *S. rugosum* by its greater size, and less rugose character; from *S. Eatoni* by its compact mode of growth, from *S. lamottense* by its inferior size and its finer lamination.

Horizon. B. Chazy.

Localities. Basin Harbor, Vt. Appletree Point, South Hero, Vt. Chazy, N. Y.

Returning now to the C. Chazy, and particularly to the horizon of *Stromatocerium Eatoni*, there are to be noticed some forms of fossils, fringing along the genus *Stromatocerium*, but whose relationships are still in doubt. In some cases they are so associated in the rock, running into each other in such intricate ways that their boundaries are obscure.

In one particular case the fossil forms a rock-mass blue in color, fine in texture, thin in structure, not readily distinguishable from the associated rocks. But to careful observation the weathered surface reveals a rippled or wavy appearance, and by polishing a banded structure is exhibited.

It is, however, when under magnification that the noticeable and real character appears. In thin sections the lighter laminae of the fossil show parallel close lying tubes or bands, simulating somewhat the structure of a coarse *Solenopora*. But the great peculiarity exists, that a portion of these tubes become, at evenly recurring places, suddenly contracted and then again enlarged, so that the structure appears like a chain of beads, illustrating completely the term *moniliform*. These bands or tubes and these beads when measured have a diameter of $\frac{1}{500}$ to $\frac{1}{300}$ of an inch.

The relationships of this necklace like fossil are not quite clear. The form itself hints at a connection with the sponges, also with the corals. In some respects it seems a stepping stone from the sponge to the coral. It certainly approaches the *Stromatocerium* in character.

Instead of introducing a new generic term to accommodate this peculiar form, it may be well to leave it provisionally with the *Stromatocerium* and give it a descriptive specific name.

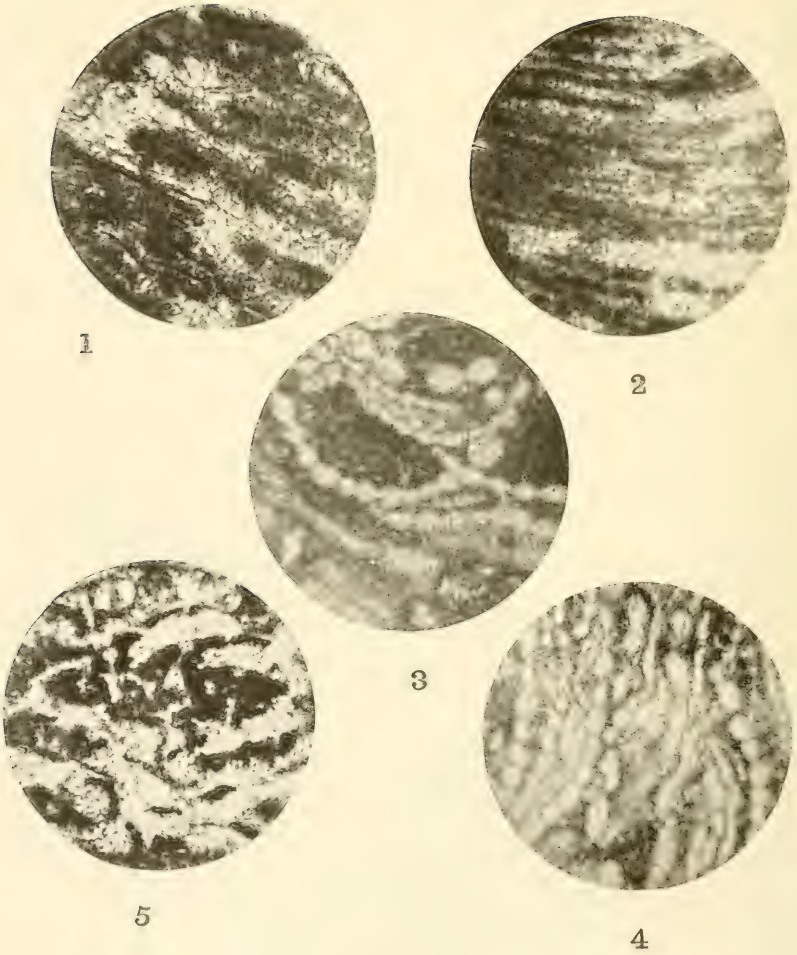
STROMATOCERIUM? MONILIFERNUM n. sp.

Pl. LXXIII, lower figure. LXXIV, figs. 3, 4.

A pure calcareous fossil, with wavy moss like expansions, covering the exposed weathered surface. The polished surface exhibits irregular darker and lighter bands. Under microscopic enlargement the lighter of these bands are characterized by parallel tubes a portion of which are of a necklace like structure.

Horizon. C. Chazy.

PLATE LXXIV.



Figures X 35.

1. Section of Stromatocerium Lamottense.
2. " " " Eatonii.
3-4. " " " Moniliferum.
5. " " " Rugosum.

Locality. Isle La Motte, Vt. Rocky ridge Goodell's pasture.

In connection with *S. Eatoni* and accompanying fossils, there is a form very different from these associated ones, and especially noticeable in its general character and structure. It occurs mostly as worn nodules of two to six inches across, is dark or purplish in color, and banded in structure, these bands resembling the grain of wood. It approaches *S. rugosum* in size and if the laminations were corrugated it would appear very closely related to *Stromatocerium*. But the wavy or rugose structure is wanting. Nor do the magnified sections correspond to *Stromatocerium*.

The structure, however, both microscopic and macroscopic, does approach that of the genus *Cryptozoon*, while its purple color and its bands correspond to the first recognized, though not the first named species of the genus. Such a fossil is found in the Beekmantown rocks at Shoreham, Vt., and is specifically named from the first observer, *Cryptozoon Steeli*. This Upper Chazy form were it down in the Beekmantown, might easily be referred to the genus *Cryptozoon*. That it may have a place until its nearer relationships are determined, it may be provisionally left with the *Cryptozoon* as here named.

Cryptozoon ? Perkinsi n. sp.

A nodular calcareous fossil of dark or purple color having the general banded character and microscopic structure of the genus *Cryptozoon*.

Horizon. C. Chazy.

Locality, Isle La Motte, Vt.

Interesting questions concerning the genus *Stromtocerium* easy to ask, arise here. Among the inquiries would naturally be the following: the character of the animal producing the calcareous masses, its mode of growth, its manner of propagation, its ancestry, its relationship with other forms.

At this far away time with the changed material at hand, it is doubtful if these questions can be answered in a wholly satisfactory way. Yet some considerations and, perhaps, some helpful facts may be presented.

The solitary silicified form *S. rugosum* so well characterized as

an excrescence, offers very little by way of suggestions to settle these points. Yet some cases of unsilicified and apparently immature examples give a hint. These taken with the newly observed forms do go quite a little way in answering some of the questions. *S. rugosum* exhibits in growth a dome like mass, with few furrows or corrugations and with lamina above lamina. The connection of the overlying lamina with that below is obscure, yet in some cases there seem to exist pillars or tubes reaching from below upward, though without uniform system.

The mode of growth of the much later *Stromatopora* is very suggestive as to the growth of *Stromatocerium*. Instead of passage through tubes or hollow pillars (?) circulation through porous calcareous stroma of the *Stromatocerium* may have been possible.

The weather worn sections of *S. Eatoni* indicate that the surface of the living form bore close set eminences or mammillae, growth taking place over and among these. See Plate LXXI.

The *S. lamottense*, so far as observation has gone, had its upper surface raised into a series of waves, a coarse ridgy growth. This in cross section shows saw or sierra like projections as may be seen in Plate LXX, lower figure.

The relationship of these ancient animals is yet obscure. While verging in some ways toward the coralline structure they still seem to be holding to a sponge like form. Here among the sponges, where so many uncertain species are provisionally consigned, the *Stromatocerium* may rest.

Some suggestions are here offered as to the possible relationships between the genus *Stromatocerium* and genera, both below and above. While *S. rugosum* was regarded as the sole representative of a genus that appeared and disappeared with the Black River, scarcely a hint could be expected. But from the discovery of the species here recorded, which existed at lower horizons and in far greater mass, it seems probable that *S. rugosum* was a decadent or rapidly mutating form, the culmination of the genus passing with the species *S. lamottense*.

If we now inquire as to like forms we shall see a general resemblance of the *Stromatocerium* to the *Cryptozoon* below and the *Stromatopora* above. The upper trend of life and development

would be then *Cryptozoon* of the Beekmantown, *Stromatocerium* of the Champlainian, *Stromatopora* of the Devonian.

This suggestion is greatly favored by the minute structure of these genera.

Syracuse, N. Y.
Stockton, Calif.

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